

DEPARTMENT OF DEFENSE

PARTNERS IN *Flight*

STRATEGIC
PLAN

THE CONSERVATION AND MANAGEMENT
OF MIGRATORY AND RESIDENT LANDBIRDS
AND THEIR HABITATS ON
DEPARTMENT OF DEFENSE LANDS



Report Documentation Page			Form Approved OMB No. 0704-0188		
Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.					
1. REPORT DATE 28 JUL 2004		2. REPORT TYPE		3. DATES COVERED 00-00-2004 to 00-00-2004	
4. TITLE AND SUBTITLE Department of Defense Partners in Flight Strategic Plan			5a. CONTRACT NUMBER		
			5b. GRANT NUMBER		
			5c. PROGRAM ELEMENT NUMBER		
6. AUTHOR(S)			5d. PROJECT NUMBER		
			5e. TASK NUMBER		
			5f. WORK UNIT NUMBER		
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Secretary of Defense Environment, Washington, DC			8. PERFORMING ORGANIZATION REPORT NUMBER		
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)			10. SPONSOR/MONITOR'S ACRONYM(S)		
			11. SPONSOR/MONITOR'S REPORT NUMBER(S)		
12. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release; distribution unlimited					
13. SUPPLEMENTARY NOTES					
14. ABSTRACT					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT Same as Report (SAR)	18. NUMBER OF PAGES 44	19a. NAME OF RESPONSIBLE PERSON
a. REPORT unclassified	b. ABSTRACT unclassified	c. THIS PAGE unclassified			

A MESSAGE OF SUPPORT



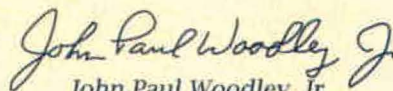
Migratory bird populations are declining throughout the Western Hemisphere. Many of these birds use military lands for feeding and resting during their migrations, and for nesting and breeding during the summer months. Because birds do not recognize geopolitical boundaries, it is up to all land managers to work cooperatively to stem declines in bird populations.

In 1991, the Department of Defense (DoD), through each of the military services, joined the Partners in Flight (PIF) initiative. DoD is now working in partnership with over 300 federal and state agencies and nongovernmental organizations for the conservation of Neotropical migratory and resident birds and their habitats. Through this partnership, DoD actively manages its natural resources to support mission needs and flight safety goals, while pursuing a sound conservation ethic that strives to benefit bird species throughout the Americas.

The DoD PIF program described here offers a coordinated framework for incorporating bird habitat management efforts into installation Integrated Natural Resources Management Plans. DoD's strategy focuses on inventory, on-the-ground management, education, and long-term monitoring to determine changes in migrant bird populations on DoD installations.

Our vision is to support the military's training and testing mission while being a vital and supportive partner in regional, national, and international bird conservation initiatives. Wherever possible, we will strive to implement cooperative projects and programs on DoD lands to benefit the health and well being of birds and their habitats.

Our mission is to ensure that all Services have access to the land, sea, and air resources necessary to ensure national security. We recognize that sustainable use of these resources aids the military mission and enhances the natural environment. I am very proud of the efforts our natural resources personnel put forth on a daily basis to accomplish this mission. I wholeheartedly and enthusiastically support the PIF program and look forward to DoD's leadership role in this important partnership.



John Paul Woodley, Jr.
Assistant Deputy Under Secretary of Defense
(Environment)



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<http://www.dodpif.org>





Illustration by Michael L. Gray

The American Redstart, found in forests throughout North America, is featured on the national Partners in Flight and DoD Partners in Flight logos.



Illustration by David H. H.

Some of the most popular migrants are waterfowl, which migrate in distinct flyways. The North American Waterfowl Management Plan (NAWMP) is a broad-based initiative that supports partnerships to enhance waterfowl populations through wetland habitat protection and enhancement. DoD has implemented waterfowl enhancement plans in support of NAWMP at 13 installations, and made wetland habitat modifications at numerous other installations.



Illustration by Michael L. Gray

Many shorebirds are neotropical migrants, and travel in large flocks. Their use of migration staging areas has evolved to coincide with abundant seasonal food resources, such as horseshoe crab spawning in late spring at Delaware Bay. Conservation of shorebirds is promoted through the Western Hemisphere Shorebird Reserve Network and the United States Shorebird Conservation Plan.



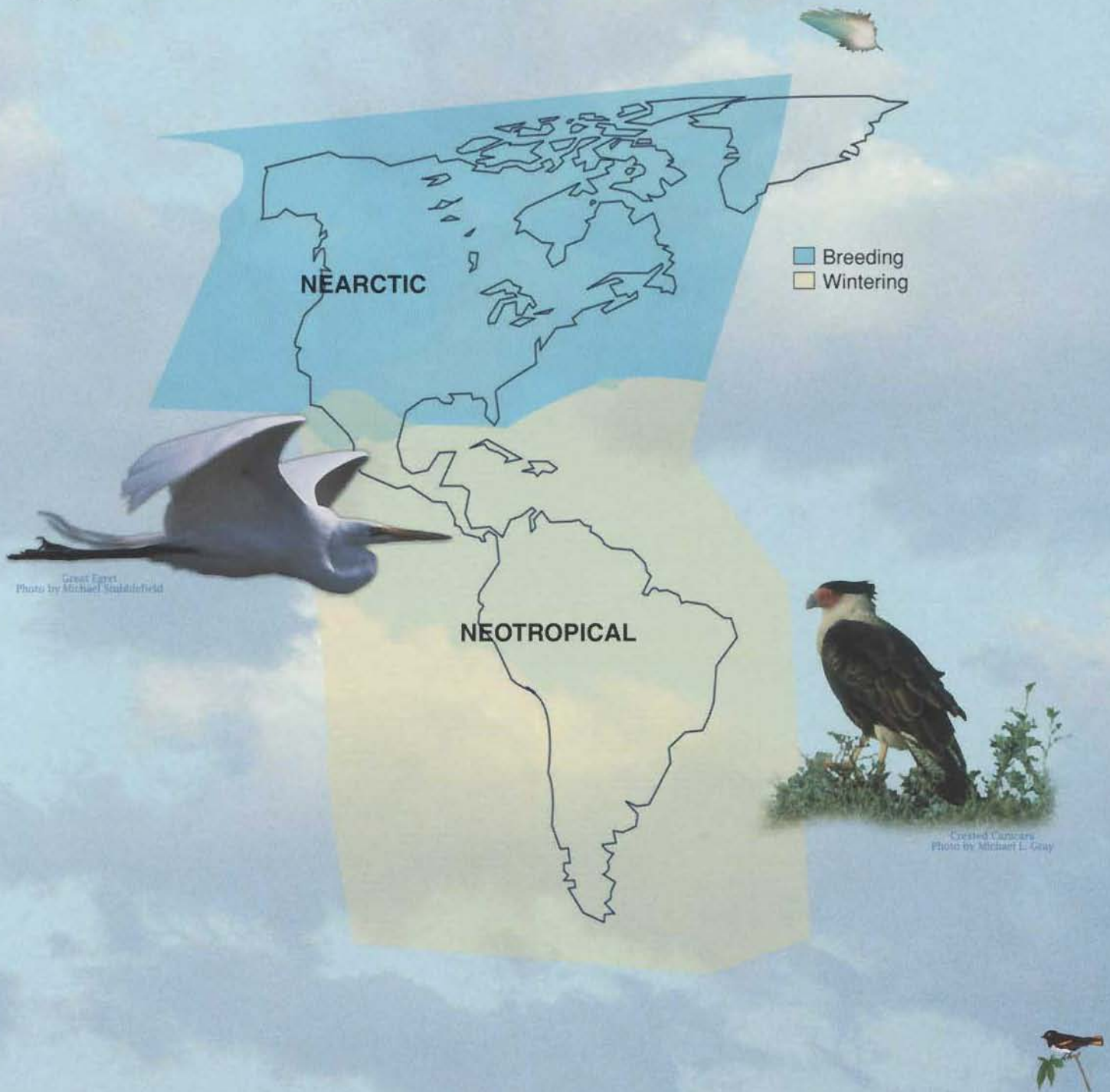
Illustration by Michael L. Gray

The North American Waterbird Conservation Plan addresses the unique life history requirements of waterbirds. Most of these species nest colonially and all depend upon water throughout their lives. Some seabirds spend the majority of their existence at sea, depending upon coastal cliffs or islands for breeding sites. Herons and egrets may be more tolerant of human development, but are more susceptible to chemical contamination than many other birds.

INTRODUCTION

WHAT ARE NEOTROPICAL MIGRATORY BIRDS?

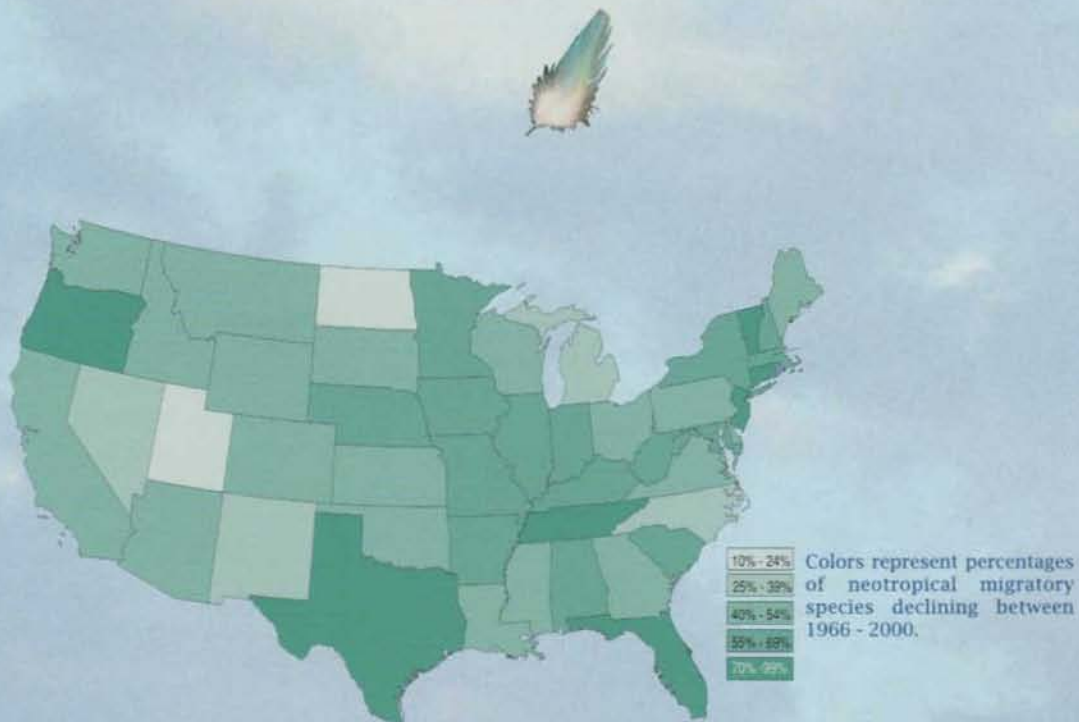
Neotropical migratory birds, sometimes called nearctic-neotropical migrants, are those species that nest in the United States and Canada ("nearctic" region) and migrate south to the tropical regions of Mexico, Central America, South America, and the Caribbean ("neotropics") for the winter. Migration is predicated primarily upon food resources. Since most insects become unavailable during our harsh winters, insect-eating birds find abundant food resources in the tropics. Many raptor species also follow this migrating food chain. Over half of all bird species nesting in the US are classified as neotropical migratory birds. Some or all of the populations of 338 species - which include many of our songbirds, waterfowl, birds of prey, waterbirds and shorebirds - migrate each fall to the tropics.



INTRODUCTION

HISTORY - CAUSE FOR CONCERN

One hundred years ago, the biggest problem for birds was the shotgun. Humans hunted all types of birds for sport, collection, food, nuisance control, or in the case of herons and egrets, for their beautiful and showy plumes used to adorn ladies' hats. The Migratory Bird Treaty Act of 1918 solved many of those problems, but as Scott Weidensaul reports in his book, *Living on the Wind: Across the Hemisphere with Migratory Birds*: "Today, however, the biggest threats to migratory birds do not come from the barrel of a gun, nor are they easily cured by passing laws. They arise from habitat loss and the wholesale environmental changes we have imposed on the natural world."



Breeding Bird Survey (BBS) data reveal that neotropical migrants (NTM) have declined since 1966. Although population trends vary by species and state, the overall trend is downward.



Black-throated Blue Warbler
Photo by Michael Stubbiefield



Photo © Brian E. Small

The **Cerulean Warbler** nests in mature deciduous forests in the eastern US, and winters in forests of the northern Andes of South America. It is sensitive to forest fragmentation, and has decreased by more than 3% per year since 1966 (total population decline >50%) despite range expansions to the north and east. This habitat specialist is one of the highest priority Partners in Flight species.



Kotelnyy Long Range Radar Site, Kotzebue, AK
Photos by Chris Elmer

Habitat generalists, like the **Common Raven** and other corvids, can adapt more easily to habitats in close proximity to human development than birds that are habitat specialists. Habitat generalists may even thrive in these settings. Raven populations have increased about 3% per year since 1966. Corvids—which include ravens, crows, jays and magpies—inhabit virtually every habitat in North America and are known to prey on the eggs and young of passerine (songbird) nests.





Great Horned Owls
Photo by Mike Riser

Flight Plan



The Flight Plan, Partners in Flight's blueprint for bird conservation planning, consists of four key elements:

- Setting Priorities
- Establishing Objectives
- Conservation Action
- Evaluation

INTRODUCTION

DEVELOPMENT OF PARTNERS IN FLIGHT AND THE FLIGHT PLAN

Neotropical migratory birds are a diverse group, relying on a wide range of habitats during their breeding and non-breeding seasons, as well as during migration. Effective bird conservation necessitates coordinated efforts that improve these habitats and contribute to the overall health of ecosystems. Given the vast geographic ranges of neotropical migrants, the variety of species, and the incomplete knowledge of their life cycle requirements, it is clear that conservation partnerships spanning geopolitical and taxonomic boundaries are critical to the success of migratory bird conservation efforts.

In 1990, the National Fish and Wildlife Foundation initiated the Neotropical Migratory Bird Conservation Program, known as "Partners in Flight - Aves de Las Americas." The initiative stresses the importance of international conservation partnerships to focus limited resources—financial and human—to provide for the long-term health of avifauna throughout the Western Hemisphere. The purpose of the program is to bring together the diverse array of groups and individuals involved in the conservation and management of birds and their habitats. The initial focus was on neotropical migrants, but has now spread to include most birds requiring terrestrial habitats. In the US, more than 300 partners from federal and state agencies, conservation groups, foundations, academia, and forest products companies have contributed expertise and resources to make Partners in Flight (PIF) successful in its conservation efforts.

Historically, many conservation efforts have been reactive and opportunistic. However, through its effective use of partnerships, PIF provides an opportunity to proactively develop shared goals and objectives to protect birds. PIF employs conservation measures, based on sound science, to provide the tools to identify problems, develop solutions, and evaluate results. Sound conservation science also lowers the likelihood of making incorrect decisions, wasting limited resources, and/or further jeopardizing critical resources. The PIF strategy for effective conservation relies on setting realistic biological priorities, using an appropriate geographic scale, and applying an ecosystem management approach. The blueprint for this strategy is known as

The Flight Plan

Department of Defense (DoD) Integrated Natural Resources Management Plans (INRMPs) employ many of these same conservation principles. These plans can utilize birds as indicators of overall ecosystem health because the food sources upon which they rely do not thrive in degraded habitats. Another benefit of using birds as ecosystem health indicators is the ease of monitoring and surveying populations compared to other fauna. The Monitoring Avian Productivity and Survivorship (MAPS) program works in tandem with landscape modeling and analysis techniques to provide accurate data on habitat conditions. Avian population and health data also helps natural resources managers create and maintain healthy, functional ecosystems.



Red-winged Blackbird
Photo by Michael Shabazz



INTRODUCTION

HUMAN IMPACTS ON BIRD HABITAT

Radar tracking indicates that, during peak migration, hundreds of thousands to millions of birds may arrive on US coastlines each day. This thin ribbon of land at the water's edge is critical to migratory birds arriving here after strenuous hours of nonstop flight from southern wintering grounds. Radar data have helped scientists and resources managers discover significant stopover "steppingstone" areas where birds rest and refuel during migration. As these sites are developed or degraded, migratory birds may be forced to fly on, resulting in increased bird fatalities due to exhaustion or starvation.



Wetlands
Photo by Michael Stubblefield

While human activities have altered the natural landscape, sometimes with significant impacts, the extent to which such activities have affected military installations and the significance of the impacts is not thoroughly understood. Human development in coastal areas has increased more rapidly than in non-coastal areas. The popularity of coastal areas for vacation and retirement also creates an irregular population density within 60 miles of many coastlines. The Pacific, Gulf of Mexico, and Atlantic coasts are home to 40% of the US population, while only accounting for 7% of the total US landmass. The mid-Atlantic coastal area, geographically about 1% of the US landmass, alone houses 16% of the entire US population.

As coastal areas become more densely populated, increasing pressures will be placed on military lands. In some highly developed coastal areas, military lands already are the last remaining islands of biodiversity. When this occurs, DoD installations harbor a disproportionately high number of state and federally listed species. It is in the best interests of the military and bird conservationists to employ proactive partnerships to protect undeveloped tracts of habitat and avoid future listings. These partnerships can also help to protect critical habitats in and around military installations from future development.



Percent Increases in
Human Population Density

	Pacific	Gulf	Atlantic
1940-1985	270%	239%	78%
1960-1994	194%	170%	135%

INTRODUCTION

HUMAN IMPACT ON BIRD HABITAT

Forest cover provides critical resources to birds migrating northward to their breeding grounds. Many species of migrants travel in large flocks following closely behind the hatching of insect larvae on newly leafing trees. As these birds move northward, finding healthy, intact forests is crucial to their health and survival. Forest breeding species require suitable nesting habitats void of fragmentation. Even where large forest tracts exist, fragmentation can severely impact bird habitat suitability.



Forest/Water Habitat in Maine
Photo by Norman Farnsworth



After a half-century of recovery, forests are again on the decline. Some forest habitats have been virtually eliminated and others have undergone long-term, perhaps irreversible change. The impacts of these changes may adversely affect neotropical migratory birds as they look for resting, feeding, and nesting sites. Each dot represents 25,000 acres.



BIRD CONSERVATION



A LANDSCAPE PERSPECTIVE

Birds are generally adaptable and resilient to gradual changes in the landscape. They survived the massive transformations of the Pleistocene era and the advancing and retreating glaciers that accompanied it. However, as human influence permeates even the most pristine and remote natural areas, many bird species face environmental changes that can overwhelm their ability to adapt and persist. One of the least widely recognized, but perhaps most pervasive, anthropogenic impacts on terrestrial birds of North America is the alteration of natural processes such as fires and floods. Due to an increase in global commerce, the introduction of invasive species has impacted bird populations by out-competing native fauna and disrupting normal ecosystem functions. The large-scale alteration or loss of habitats and conflicts with agriculture and other human economic interests further exacerbate the rapid decline of some bird species.

Conservation of birds depends on a clear understanding of both avian habitat requirements and sustainability. The study of landscape ecology has greatly advanced our knowledge of these habitat requirements and the underlying ecological processes. However, modern conservation efforts rely on scraps of information and anecdotes about landscapes from the 17th and 18th centuries. Alternatively, relict patches of relatively untransformed habitat are an excellent source of information about their functionality and sustainability.

As we learn more about how ecosystems historically functioned, we increase our understanding of important ecological processes. Restoration may require large, contiguous blocks of habitat, and results may not be fully realized for a long time. In the interim, we must be careful not to lose the basic building blocks—including the species of organisms—that are needed to rebuild damaged ecosystems. These may exist as relict patches of natural habitat, partially restored habitat, or even artificial habitats that provide the basic ecological functions. Military lands often contain such habitat building blocks, especially in areas where human impacts have been minimized.



Grassland Sparrow
Photo by Michael L. Gray

The goal of most bird conservation efforts is to maintain fully functioning natural ecosystems that can provide for the needs of various and differing species. However, connectivity of populations also must be considered. Even a relatively large population in a large conservation area is vulnerable if it is completely isolated from other populations of the same species, and even relatively large nature preserves can lose many of their most distinctive species if the surrounding landscape is transformed completely. Successful partnerships with both public and private landowners can build regional networks of ecosystems that fulfill avian conservation needs such as connectivity of populations, food availability for

nomadic species, and seasonal habitats for migratory species. Learning where these species move—and which habitats they use along the way—is critical to sustaining their populations.

BIRD CONSERVATION

A LANDSCAPE PERSPECTIVE

Maintaining ecological processes and the species that depend on them across landscapes that are intensively used by people is also essential to planning. The potential for military lands to benefit priority bird species depends on the collection of accurate species population and habitat data. Disturbance dependent species, including the federally listed Black-capped Vireo and Red-cockaded Woodpecker, find significant refuge on military lands. Partnerships with sister agencies and neighbors leverage greater benefit to these and other priority species. For example, while a DoD installation may continue to manage early successional habitats that require frequent natural or artificial disturbances, a neighboring agency or other landowner may provide habitat for species associated with mature forest or other relatively undisturbed habitats. By operating at a landscape scale, management actions can optimize limited resources and maximize the benefit to avian and other species.

The Crystal River flows through Leelanau County in the Northern section of Michigan's Lower Peninsula. The importance of adjacent riparian habitat to migratory birds and other regional wildlife, as well as maintenance of water quality, was instrumental in helping the Army Corps of Engineers protect this reach of the river from a housing and golf course development.



Photo by Richard Fischer



Army Corps of Engineers projects, which include significant land and water holdings throughout the country, provide critical habitat for migratory and resident birds.



BIRD CONSERVATION

THE MIGRATION CYCLE

Birds on breeding grounds establish territories, form pair bonds, build nests, lay and incubate eggs, and raise their young. Throughout this time, they are subject to predation, foul weather, disease, and disturbance from human activity. In late summer, migrant species begin to prepare for their southward exodus by consuming large amounts of food to build fat reserves. Billions of neotropical migrants fly southward to Latin America searching for suitable tropical wintering grounds. In addition to being up to eight times more concentrated on wintering grounds than on their breeding areas, these migrants also share their wintering habitats with the resident tropical species. This concentration effect makes the loss and alteration of tropical habitats especially destructive to neotropical migratory bird populations.



Photo by Michael J. Gray

The Magnolia Warbler breeds in thickets and woodlands across Canada and in the north central and northeast US. It winters in similar habitat along coastal Mexico and Central America.



Palm Warblers breed primarily at the edge of spruce bogs across Canada and into northern edges of the central and northeastern US. These birds prefer brushy areas around woodland borders during migration and in their winter habitat in coastal areas around the Gulf of Mexico and the Caribbean.

Photo by Michael J. Gray

The Western Wood-Pewee breeds in open, mostly coniferous woodlands and in floodplains and riparian forests. It breeds throughout a large portion of western North America, but is limited to northern Andean highland forests during the winter.



Photo by Ian Tall



BIRD CONSERVATION

It is an auspicious time for bird conservation. Auspicious is defined as "affording a favorable auspice." The Latin origins of the word auspice mean to divine or foretell the future by watching the movements of birds. Indeed, the science of bird conservation today does depend upon our ability to observe and correctly interpret the response of birds and trends in bird populations to changes in the landscape. It also is a favorable time for bird conservation as evidenced by recent successes of major initiatives.

Partners in Flight (PIF) has developed a scientifically credible means of prioritizing birds and their habitats called the Species Assessment Process. This system uses seven criteria to rank a species' vulnerability to determine its priority in conservation planning. Another tool for bird conservation is the PIF Watch List, which was developed on the basis of the Species

Assessment to highlight those birds not already listed under the Endangered Species Act that most warrant conservation attention. The Species Assessment also forms the basis for the US Fish & Wildlife Service (USFWS) Birds of Conservation Concern list. Priority bird species and habitats are the scientific basis of PIF Bird Conservation Plans that cover the entire US and are implemented locally using Best Management Practices, Bird Conservation Areas, and Important Bird Areas. Using these and other innovative technologies, PIF initiatives are delivering bird conservation through regionally based, biologically driven, landscape-oriented partnerships.

The vision of integrated bird conservation, as coordinated through the North American Bird Conservation Initiative

(<http://www.nabci.org>), is to see "populations and habitats of North America's birds protected, restored, and enhanced through coordinated efforts at international, national, regional, state, and local levels, guided by sound science and effective management." This vision will be accomplished by (1)

broadening bird conservation partnerships; (2) working to increase the financial resources available for conserving birds in the

US and wherever else they may occur throughout their life cycle; and (3) enhancing the effectiveness of those resources and partnerships by facilitating integrated bird conservation actions. Eugene Odum, considered the "father" of ecosystem ecology, said, "the whole is greater than the sum of its parts." This applies to ecosystems as well as the partnerships working to protect them.

By incorporating holistic bird conservation into the Integrated Natural Resources Management Plan (INRMP) process, installations are adopting habitat based conservation measures grounded in sound science, effective partnerships, and adaptive natural resources management.



Great Blue Heron
Photo by Mike Blair



House Finch Impaled by Spike on Barbed Wire
Photo Courtesy Ft. Riley, KS

Soft Clementine Tanager
Photo by Tim Burt



Red-headed Woodpecker
Photo by Mike Blair



BIRD CONSERVATION

DoD's CONTRIBUTION TO PIF

As a vital partner in the PIF effort, DoD has contributed significant resources through the DoD Legacy Resources Management Program (Legacy) and other funding sources to promote cooperative projects to advance the PIF program. DoD biologists make significant contributions to PIF bird conservation planning efforts and provide key leadership in various working groups.

North America's bird species occupy a wide range of habitats and many are very sensitive to environmental change. Therefore, they can be excellent indicators of an area's biological diversity and the relative health of associated ecosystems. In addition to serving as natural laboratories, DoD lands represent a critical network of habitats for birds that offer migratory stopover sites for resting and feeding as well as many suitable sites for nesting and rearing their young. Military mission training requirements depend on the availability to use lands that are not degraded. In some cases, training activities help maintain healthy, functioning ecosystems, such as grasslands dependent upon periodic fires, or benefit birds, such as those that require some light ground disturbance. Additionally, conserving wildlife habitats and biodiversity helps minimize future listings of species.

Important Bird Areas (IBAs) are significant areas that host large concentrations or exceptional diversities of birds, harbor rare or endangered species, or contain unique or threatened habitat. The IBA program goal is to identify and protect a network of state, national, and global sites around the world for the purpose of maintaining naturally occurring bird populations. IBAs encourage conservation without imposing specific management requirements. The recognition of military lands as IBAs lets the public know that these lands are managed to support the military training mission while also benefiting bird conservation. Approximately 6% of the global IBAs in the US occur on military and Army Corps civil works project lands. State IBAs include additional military lands that provide essential habitat to birds.

Larensen Air Station, Sitka Island, AK
with Agattu Island in background
Photo by Chris Dieck



Yankeeburg AFB, CA
Photo by Chris Dieck

Critical Riparian habitat on DoD land adjacent to non-DoD agricultural land where riparian vegetation has been completely removed.




BIRD CONSERVATION

DEPARTMENT OF DEFENSE PARTNERS IN FLIGHT STEPPINGSTONES OF MIGRATION

"A thing is right when it tends to preserve the integrity, stability, and beauty of the biotic community. It is wrong when it tends otherwise."

- Aldo Leopold

This map illustrates the strategic location of DoD installations in relation to migratory bird pathways. The Department of Defense manages approximately 25 million acres of land. The Army Corps manages an additional 12 million acres of land and water on civil works projects. Much of this area is used by neotropical migratory birds as they migrate between breeding and wintering grounds. We work daily to protect critical stopover habitats on installations. This helps ensure that migratory birds have the steppingstones they need to successfully complete their long migrations. The DoD PIF mission aims to ensure maximum availability of land, sea, and air to accomplish the military mission by maintaining healthy habitats and ecosystems.



Seabirds, Gulls & Terns
Shore & Wading Birds
Waterfowl
Land Birds & Birds of Prey

Map reproduced with permission from National Geographic Society



BIRD CONSERVATION

PIF'S INFLUENCE ON DoD

Partners in Flight (PIF) offers the Department of Defense (DoD) the opportunity to participate in an international effort to enhance stewardship of natural resources on our lands. Continued participation in this collaborative effort will help maintain existing partnerships and foster new ones. These partnerships improve communication between public and private sector natural resources specialists, provide DoD access to a broad range of information regarding current and emerging bird conservation issues, and offer a forum for DoD to communicate its unique stewardship role of integrating natural resources protection into national defense mission requirements. It is in our best interest to work proactively with partners to conserve and enhance habitats at a regional scale. Such partnership efforts are the most cost-effective and ecologically sound means for implementing conservation objectives across geographic and organizational boundaries. These efforts are required now, before it's too late to maintain stable populations of birds and other fauna and flora found on military lands.

The PIF initiative provides a scientific foundation for DoD to maximize effectiveness of management resources, enhance the biological integrity of our lands, and ensure continued use of lands to fulfill military training requirements. Participating in broad-scale partnerships also helps us to more effectively meet our trust responsibility to conserve our nation's biodiversity.



Nesting Area Warning Sign, Ft. Hood, TX
Photo by GJ Eckrich



Controlled Burn, Ft. Hood, TX
Photo by Dennis Herbert



American Crow
Photo by Michael Studdelfield



Photo by Michael Studdelfield



Scarlet Tanager
Photo by Michael Studdelfield



Kansas River, Ft. Riley, KS
Photo by Mike Blair



DoD MANAGEMENT STRATEGY

THE DoD PARTNERS IN FLIGHT POLICY

Promote and support our partnership role in the protection and conservation of birds and their habitats by protecting vital DoD lands and ecosystems, enhancing biodiversity, and maintaining healthy and productive natural systems consistent with the military mission.

The strategy described in this document will enable DoD to better integrate programs for migratory and resident birds into existing natural resources and land management programs. New and innovative management techniques aimed at protecting priority bird species will be an integral part of the planning and decision-making processes. Implementation of this strategy will allow DoD natural resources managers to determine best management practices based on regional or physiographic delineations rather than on a species basis. This ecosystem management approach provides a framework to consider the biological diversity on military lands in the context of the surrounding landscape. This approach will improve long-term planning and efficiency and promote better integration of mission and resource requirements.

PROGRAM - WIDE GOALS AND OBJECTIVES

The primary goals and objectives of the DoD Partners in Flight program are to:

- Apply information collected from this partnership program to support DoD mission requirements
- Take proactive management actions to prevent bird species from reaching threatened or endangered status
- Facilitate cooperative partnership efforts consistent with the military mission
- Determine the status of migratory and resident bird populations on DoD lands and the causes of population fluctuations
- Reduce bird aircraft strike hazard risks through implementation of mobile radar
- Maintain and restore priority habitats on DoD lands for migratory and resident bird populations
- Reduce or eliminate pesticide use in sensitive habitats, especially in and around wetlands and riparian areas
- Reduce the spread and impact to birds and their habitats of invasive and nuisance species on military lands, including feral and free-roaming cats



Black-bellied Whistling Duck
Photo by Michael Stutts/Field

DOD MANAGEMENT STRATEGY

PARTNERSHIPS

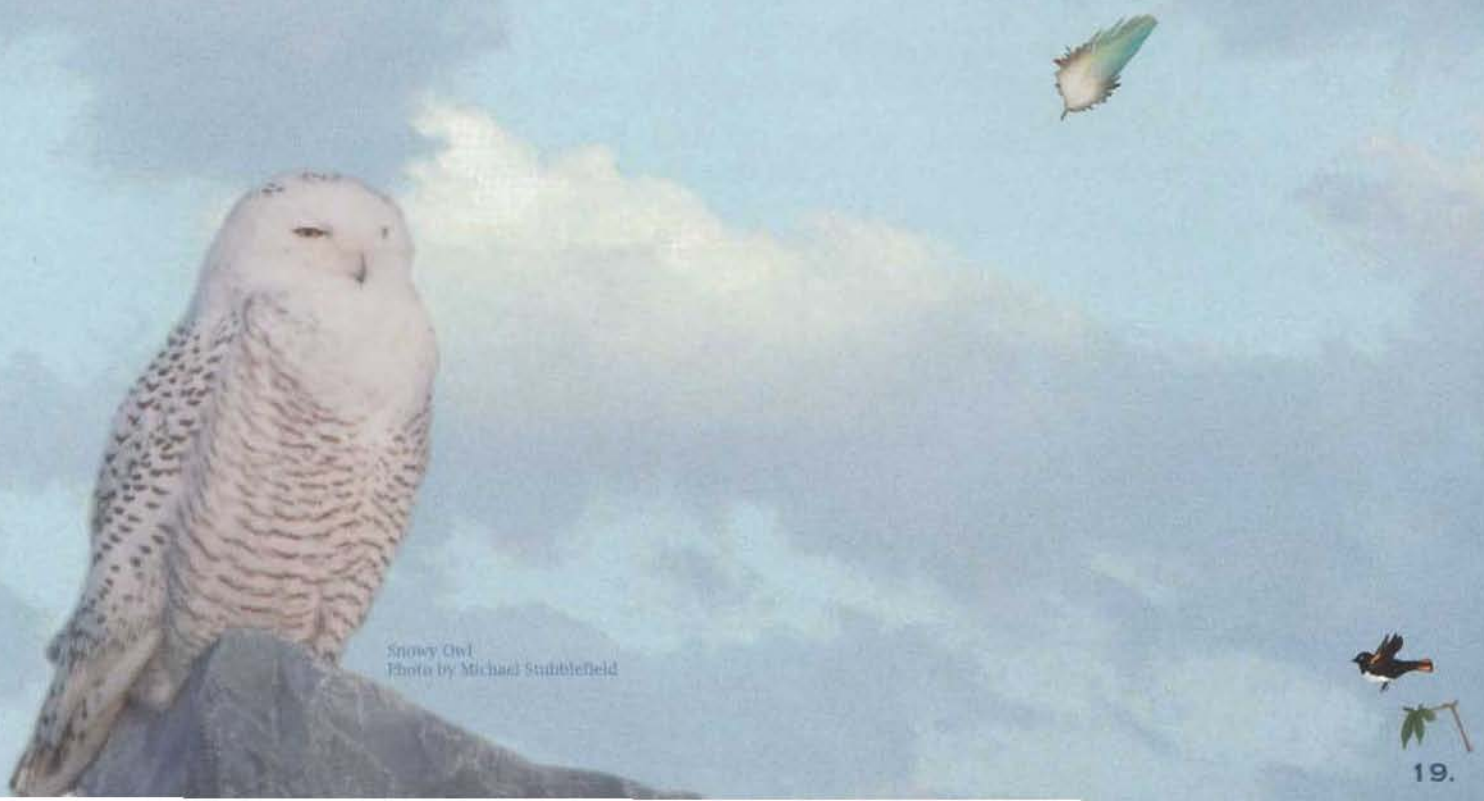
The international Partners in Flight (PIF) program is an umbrella network of agencies, corporations, and non-governmental organizations. Department of Defense (DoD) bird conservation programs are a vital part of this network. Through the National Fish and Wildlife Foundation and other groups, DoD works to develop cooperative programs and projects with PIF partner organizations. Partnering ensures a focused and coordinated approach for the conservation of resident and neotropical migratory birds and their habitats.

As signatories to the federal PIF Memorandum of Agreement, the DoD military service branches are part of the national PIF Management and Joint Steering Committees. A lead DoD representative, appointed by the Assistant Deputy Under Secretary of Defense (Environment), and a fulltime program manager promote and coordinate PIF efforts within DoD. In addition, DoD has established a network of biologists and natural resource managers to represent DoD in the various regional and technical PIF working groups. The role of DoD PIF Working Group representatives is to cultivate and maintain positive working relationships with partners, develop cooperative agreements for implementing bird conservation programs and projects on military lands, and facilitate communication and information sharing across geographical and political boundaries. These working group representatives promote implementation of local and regional conservation objectives such as establishing habitat corridors that encompass DoD and adjacent lands. They also participate and provide leadership in various state, regional and national PIF working groups and committees.

A STRATEGY FOR DoD ACTION

The DoD PIF program includes four regional working groups (Northeast, Southeast, Midwest, West) and six technical working groups (Monitoring, Research, Communications, Education, BASH, International). These groups identify actions compatible with the military mission that achieve the overall PIF goal of maintaining secure populations of priority birds.

The following eight pages highlight key issues facing each of the national PIF regional and technical working groups, their goals and objectives, and DoD priority support efforts.



Snowy Owl
Photo by Michael Stubblefield

REGIONAL WORKING GROUPS

NORTHEAST

ISSUES AND CHALLENGES

Maintaining functional natural ecosystems is the greatest conservation challenge facing land managers within 125 miles of the Atlantic coast. Most military installations in the region fall within this zone, placing an increased burden on DoD to maintain expanses of intact habitat that may not exist elsewhere.

Forests dominate the landscape in much of the region. Many of these forests are private industrial timberlands and often are heavily fragmented. Reconciliation of the need for long-term, sustainable timber production with habitat needs of high priority bird species is imperative for the successful conservation of these species. Sustainable commercial forestry practices are crucial to bird conservation in the northeastern US, as loss of the economic stability of commercial forestry could result in conversion of forest habitats to urban development or other less bird-friendly landscapes. The preservation of open space adjacent to public lands, including DoD installations, is critical to enhancing bird populations and habitats.

Agricultural grasslands constitute the most extensive grassland systems in the region. These grassland habitats and the interspersed fresh water wetlands are vital to breeding and migrating waterfowl and other wetland bird species. However, changing agricultural practices, hay mowing, and the development or succession of abandoned farms have led to severe declines in some grassland bird species. Consequently, some of the most productive grassland habitats in the Northeast exist on Army bases and around military airfields. Managing these grasslands to benefit both the military mission and bird habitat conservation is a priority

DoD PIF PRIORITIES

- Manage airfields for grassland bird species while reducing Bird Aircraft Strike Hazard (BASH; see page 33) risk
- Survey mountaintop training sites for presence of Bicknell's Thrush.
- Ensure sustainable timber operations that provide adequate habitat in appropriate forest age classes
- Implement recommendations, where appropriate, in the PIF Northeast Working Group's "Communication Towers and Migrating Birds" guidelines
- Promote the establishment and use of native, warm season grasses as a late-season hay crop to minimize impacts to nesting grassland birds
- Maintain early successional habitats and disturbance processes



Grassland Habitat, Dover, NJ
Photo Courtesy Ft. Drum



Early Successional Habitat in Maine
Photo by Norman Farnold



REGIONAL WORKING GROUPS

SOUTHEAST

ISSUES AND CHALLENGES

The conversion of pine forest, especially longleaf pine and associated grasslands, to short rotation pine plantations has impacted pine forest communities as well as the adjoining bottomland hardwood and riparian communities. Military installations in the Southeast contain some of the best remaining longleaf pine ecosystems and contribute to significant bottomland hardwood and floodplain forest acreage. Other significant conservation issues in this region include the conversion of grasslands and savannahs to agriculture and other uses, and grassland fragmentation and degradation. Several installations in the southeast can help fulfill this conservation need by maintaining warm season grasslands and providing year round habitat for grassland dependent species.

Shorebird and waterbird conservation issues are important along southeastern coasts. Loss of and disturbance to wetland and riparian habitats has reduced available avian habitat. Coastal development increases the pressure on military lands for use of open nesting beaches by priority shorebirds. Nuisance species, notably feral cats, also impact bird populations in these areas.

DoD PIF PRIORITIES



- Identify DoD sites that will meet the desired PIF acreage requirements for forested floodplain wetlands without affecting mission needs
- Maintain bottomland hardwood forests, especially in and near coastal areas
- Document maritime bird communities under DoD management
- Continue longleaf pine-wiregrass restoration and management to support priority species
- Maintain disturbance regimes and conduct habitat management where necessary to promote early successional hardwood shrub/scrub to support priority bird species
- Monitor and protect colonially nesting waterbirds and vulnerable shorebirds
- Identify and conserve critical shorebird and nongame waterbird habitats
- Educate installation personnel and military residents on the negative impact of cats to birds and other wildlife
- Identify military lands where restoration of native warm season grasses, longleaf pine communities, and associated fire regimes are feasible
- Support wintering grassland bird monitoring and research on military lands



Golden-cherished Wachler Habitat, Ft. Hood, TX
Photo by Gili Eckstein



Backwater Swamp, Bottomland Hardwood Forest, Ft. Stewart, GA
Photo by Chris Thorne



REGIONAL WORKING GROUPS

WEST



ISSUES AND CHALLENGES

Modification, degradation, and loss of habitat affect virtually all habitat types in the West. Impacts from grazing, timber harvest, conversion or development result in loss of available habitat for nesting, migration stopover, and wintering sites. This leads to reduced productivity from diminished food resources and increased predation and parasitism. Restoration of some habitats, such as grasslands, forests, and riparian areas, is feasible. However, it is very difficult to restore some habitats, for example shrubsteppe when nonnative cheatgrass invades. Therefore, conservation of existing habitats should be a priority where possible. Restoring natural disturbance patterns, such as fire and flooding, is also crucial to conserving certain habitats.

Recreational use of public lands can also cause reduced productivity or breeding use by birds, and deserves increased evaluation in priority habitats. Electrocutions from improperly protected power lines continue to be a significant source of mortality to raptors.

DoD PIF PRIORITIES

- Identify shortgrass prairie species on DoD lands and use management practices from "Best Management Practices for Shortgrass Prairie Birds" as appropriate to ensure their sustainability
- Work with the PIF Shrubsteppe Working Group to identify the extent of sagebrush habitat on DoD lands and incorporate appropriate management recommendations from "Birds in a Sagebrush Sea"
- Integrate bird conservation with recreational use in ecologically sensitive areas on military lands
- Work in cooperation with established raptor protection programs
- Participate in region- and state-wide monitoring and research efforts, as appropriate
- Identify water use pattern modifications that can improve hydrology in arid sites for native vegetation and avifauna
- Support studies of paleotropical migrants on Alaska military lands



Grasslands/Canyons,
El Paso County, AZ
Photo by Chris Eberly



The Coast, Vandenberg AFB, CA
Photo by Chris Eberly





REGIONAL WORKING GROUPS

MIDWEST

ISSUES AND CHALLENGES

Grasslands are among the most threatened habitats in the Midwest. The majority of native grasslands have been lost to agriculture or development. Remaining grasslands have been degraded by suppression of natural disturbance patterns and other human activities. Grassland bird species suffer from increased predation and parasitism due to these human-induced changes in the landscape. A priority in the Midwest is to identify and protect, or create through restoration, grassland bird conservation areas – areas with a core of 2,000 grassland acres and a one-mile-radius matrix that includes at least 2,000 more grassland acres. However, our knowledge of grassland ecology, especially interdependencies on fire, grazing and drought, during breeding and wintering is still incomplete. To combat these pressures and their impacts on Midwestern bird populations we must identify remaining grassland systems, educate landowners about grassland bird habitat issues, and develop management guidelines that benefit both grassland birds and landowners.

Evolving knowledge that former riparian areas and bottomland forests along major rivers are not sustainable for agriculture or development is providing opportunities to restore large, contiguous blocks of bottomland hardwood forest in these areas. The Army Corps has significant management responsibility along these waterways and can play a major role in facilitating this restoration.

Impacts of communication towers on nocturnal migrants can be significant throughout the Midwest, especially during periods of cloud cover or inclement weather. Efforts to collocate towers and optimize lighting systems should be actively pursued.

DoD PIF PRIORITIES

- Identify DoD lands that satisfy the PIF core grassland requirements
- Support research that addresses multiple factors affecting grassland species (fire, grazing, drought), provides replicates across ecological and geographical settings, and estimates seasonal productivity and survivorship
- Support studies of breeding and wintering grassland birds on military lands
- Support efforts to restore bottomland hardwood forests, especially in agricultural areas prone to flooding
- Identify abandoned communications towers that can be razed, and maximize collocation of new communications equipment on existing towers



Henslow's Sparrow
Photo by Teresa Vanadof-Lewis



Bottomland Hardwood Forest, Ft. Leavenworth, KS
Photo by Chris Eberly

Wetlands, Ft. Riley, KS
Photo Courtesy Ft. Riley, KS



TECHNICAL WORKING GROUPS

MONITORING ISSUES AND CHALLENGES

Avian monitoring projects on DoD lands typically occur on an as-needed basis. To facilitate sharing of data among our partners, we use existing protocols appropriate for the intended objective of the monitoring project. The Integrated Training Area Management program includes a protocol, Land Condition Trend Analysis (LCTA), which currently provides non-standardized avian monitoring data. DoD PIF will work with the Army to incorporate standard monitoring protocols into LCTA, making Army data compatible with the National Point Count Database and other sources. DoD PIF also supports the process of developing standardized regional and national monitoring strategies for various bird taxa and contributes DoD survey data to existing databases.



Photo by Chris Derry

Proper management of natural resources cannot be accomplished without baseline knowledge of the habitats managed by DoD. We help identify DoD lands that lack baseline surveys of bird populations and document sites that satisfy criteria for identification as Important Bird Areas or potential core bird conservation areas. A key monitoring program used on DoD lands is Monitoring Avian Productivity and Survivorship (MAPS; see page 31), which provides specific habitat based management recommendations.



DoD PRIORITIES

- Identify installations lacking baseline avian surveys, and other monitoring needs
- Review and revise LCTA to include use of standard avian survey protocols
- Support MAPS program on DoD lands
- Contribute data to and utilize resources in the National Point Count Database
- Communicate and coordinate with adjoining landowner partners to coordinate monitoring efforts, where appropriate



Yellow-headed Blackbird
Photo by Mike Blair

TECHNICAL WORKING GROUPS

RESEARCH ISSUES AND CHALLENGES

Avian researchers frequently use military lands as research study sites because these lands provide high-quality habitats not found in otherwise fragmented and developed landscapes. DoD lands can provide needed study sites for several areas of research underway, including the study of the spread of diseases (such as West Nile Virus) by birds, determination of bird conservation area requirements, assessment of grassland bird breeding and wintering habitats, determination of optimal placement of MAPS stations and research to fill gaps in avian life history knowledge. This research will also benefit the military by helping us determine when and where species are at risk before they require state or federal protection.

The PIF Research and Monitoring Needs Database maximizes resource effectiveness and efficiency by linking research needs between partners. We contribute to the database, and access its data elements to assist in our own research needs and future projects. The DoD PIF Bird Conservation Database consolidates information on bird related projects and management on all DoD lands into a searchable web-based database.

DoD PRIORITIES

- Provide access, where conditions permit, to DoD lands to support PIF research priorities
- Update and maintain the DoD PIF Bird Conservation Database
- Contribute to the PIF Research and Monitoring Needs Database
- Identify DoD-wide research needs and issues and encourage research partnerships
- Identify DoD lands that can contribute to national PIF goals
- Maintain effective MAPS network



MAPS worker with bird in hand
Photo courtesy Ft. Riley, KS



MAPS Station, Camp Pendleton, Deluz Creek, CA
Photo by Tim Burr

Researcher with Parula; Utah
Photo by Norman Farnous



TECHNICAL WORKING GROUPS

COMMUNICATIONS

ISSUES AND CHALLENGES

PIF has made significant progress in communicating advances in bird conservation to its traditional partners. However, since bird conservation is ultimately habitat-based, there is an increasing need to reach out to non-traditional partners. Non-traditional partners include non-bird focused groups as well as federal-state, state-non-governmental organization (NGO), and private-public partnerships.

With the planning phase of PIF completed, the need to disseminate information about PIF bird conservation plans (BCPs), Important Bird Areas (IBAs) and Bird Conservation Areas (BCAs) to land managers is essential. Reaching the target audience may also involve publishing in agricultural, commodities, or other non-bird related media. Outreach efforts are underway to accomplish this objective.

DoD PRIORITIES

- Support International Migratory Bird Day and other PIF outreach efforts
- Ensure appropriate PIF BCP information is incorporated into installation INRMPs
- Provide support and assistance for PIF web site and outreach information for DENIX web site (<http://www.denix.osd.mil>)
- Contribute articles regarding DoD PIF activities to DoD publications, birding magazines, and PIF publications
- Enhance conservation objectives through partnerships that facilitate information exchange and coordinated management activities
- Continue to participate in state, regional and national PIF conferences

EDUCATIONAL

ISSUES AND CHALLENGES

Public and private land managers require technical information and educational tools to successfully incorporate bird habitat management into their management plans. These materials also serve to fill gaps in general bird conservation knowledge. By providing educational materials and hosting workshops in both the US and Latin America, we can improve bird habitat management, increase bird conservation knowledge and facilitate communication among educators.

DoD PRIORITIES

- Work with national PIF and other groups to develop materials for landowners and managers regarding grassland bird habitat and other management priorities
- Promote DoD accomplishments to the public and other agencies.
- Update DoD display and brochure as needed
- Give talks to bird clubs and school groups
- Identify and create needed educational materials



Interpretive Sign, Vandenberg AFB, CA
Photo by Chris Sherry

TECHNICAL WORKING GROUPS

BIRD AIRCRAFT STRIKE HAZARD

ISSUES AND CHALLENGES

A successful Bird Aircraft Strike Hazard (BASH) prevention program reduces loss of human life and damage to aircraft. Historical reporting of bird strikes and near strikes has rarely exceeded 20% of actual strikes. Increasing this response rate is key to maintaining a successful BASH program. To accomplish this objective, we must enhance communications between Air Operations and Natural Resources personnel. Recent research also indicates that maintaining grasses at a height for certain grassland obligate bird species reduces the attractiveness of the habitat for traditional "problem" species like hawks, gulls and geese. By working together, we can achieve mutually beneficial results that will aid priority bird species while reducing the BASH risk for flight crews. Improving communication and education among all stakeholders is a top priority of this working group.

DoD PRIORITIES

- Implement use of radar, particularly mobile units, as a BASH tool
- Improve communication with Air Operations personnel
- Integrate BASH plans into INRMPs
- Publicize the importance of reporting all bird strike and near strike data
- Help provide all available current and future hazard detection technology for pre-flight planning
- Work with the Air Force BASH Team to update BASH guidelines to reflect advances in knowledge of grasslands, seasonal bird movements, and "problem" species



INTERNATIONAL ISSUES AND CHALLENGES

The reversion of lands to the Panamanian government in 1999, under terms of the Panama Canal Treaty, greatly reduced the amount of land under DoD management in Latin America. Most DoD lands are now located on the islands of Cuba and Puerto Rico. Ongoing studies on both islands seek to gain better knowledge of wintering habitat requirements of neotropical migrants.

Winter habitat associations of many neotropical migrants still are poorly understood. Following the example of Fort Hood (TX), DoD installations need to create partnerships with Latin American biologists and conservation organizations to work cooperatively on life history requirements of migrant species breeding on military lands. A biologist exchange program at Fort Hood has helped biologists studying the Golden-cheeked Warbler on its wintering grounds gain more complete knowledge of management issues on the breeding grounds. These biologists, in turn, are teaching US biologists about wintering ground issues.

DoD PRIORITIES

- Measure density and winter survival rates of migrants on the wintering grounds at DoD installations in Puerto Rico and Cuba
- Document wintering locations of priority neotropical migrants breeding on DoD lands, and establish partnerships with local groups in wintering areas
- Promote shade grown coffee use on military installations



FUNDING

Funds to promote DoD's participation in the PIF program come from several sources. The primary source has been the DoD Legacy Resources Management Program. PIF (bird conservation) projects that encompass a regional or multi-installation scope are generally well suited for this type of funding. Legacy project proposals are submitted and tracked through the Legacy Project Tracker: <http://www.dodlegacy.org>.

Other sources of funding to implement DoD PIF projects include the Agricultural Outlease Program, Forestry Reserve Account, Sikes Act Fees and Permits (from hunting and fishing programs), and Operations and Maintenance funds.

At some installations, base commanders have initiated cost sharing projects with other federal, state, and NGO conservation partners. Grants from foundations and other sources can be used on DoD lands to support bird conservation efforts if appropriate partnerships have been developed. This can be especially useful for identifying and managing for priority species at risk.

DoD must ensure the protection of migratory and resident birds and their habitats. It is appropriate to address this management priority through each installation's INRMP. Projects to support integrated bird conservation should be well defined and detailed in the INRMP as a basis to justify program funding. Funding guidelines and suggestions for DoD natural resources managers can be found on the DoD PIF web site: <http://www.dodpif.org>.



Ring-necked Duck
Photo by Michael Stubblefield



Sayornis Gull Flycatcher
Photo by Mike Blair



Prairie Warbler
Photo by Michael Stubblefield



Black-capped Vireo Nestlings, Ft. Hood, TX
Photo by Mike Strake



Eastern Screech Owl
Photo Courtesy: D&D FG



Photo by Chris Eberly



Black-throated Green Warbler
Photo by Michael L. Gray



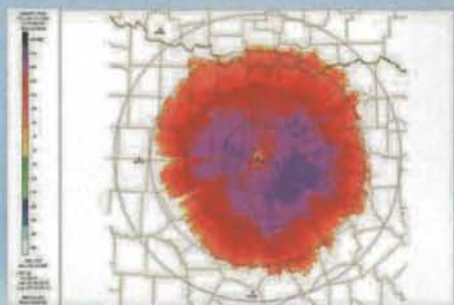
DoD BIRD CONSERVATION PRIORITIES

RADAR ORNITHOLOGY

Radar has been used since the early 1940s to monitor bird migration. In the last decade, the Clemson University Radar Ornithology Laboratory (CUROL) has used the network of WSR-88D National Weather Service Doppler weather surveillance radars to map bird migration patterns over the entire US. These efforts have helped scientists and resource managers discover significant stopover "steppingstones" where birds rest and refuel during migration. These data also help pilots avoid bird collisions by providing them with the necessary data that allows them to steer clear of a migratory exodus. CUROL tracks seasonal, regional, and year-to-year variation in migration to monitor the long-term health of the North American migration system.

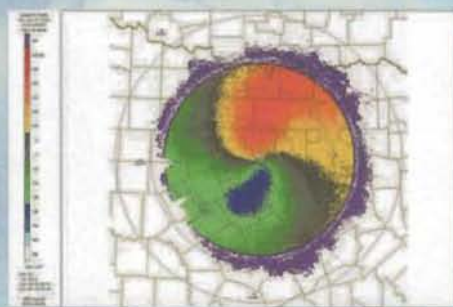
A network of portable, modified marine radars stationed on airfields near runways will provide real-time monitoring of bird movements. The radar beam can be directed to capture the most critical flight paths, that of the take-off and landing path, where more than 90% of all bird strikes occur. The radar data will be accessible to military aviators through the military's computer network, greatly enhancing a pilot's real-time nationwide flight planning capability.

CUROL: <http://www.clemson.edu/birdrad/>



Base Reflectivity image shows the relative reflectivity from different densities of migrating birds over the Dallas, Texas, area.

Base Velocity image shows the radial velocity of migrating birds over the same area. Birds are moving from cool colors to warm colors and perpendicular to the white band.



DoD BIRD CONSERVATION PRIORITIES

MONITORING AVIAN PRODUCTIVITY AND SURVIVORSHIP

The Monitoring Avian Productivity and Survivorship (MAPS) program is a continent-wide bird monitoring program organized by the Institute for Bird Populations. The MAPS constant-effort mist-netting technique collects population trend and demographic data (productivity and survivorship) on breeding birds, providing valuable insight about breeding productivity and annual survivorship. While DoD typically only has direct management control of breeding habitat for neotropical migrants, military lands may constitute both breeding and wintering grounds for temperate migrants and resident species. Monitoring productivity and survivorship is important to help determine whether land (habitat) management actions should be directed toward a species' temperate breeding grounds, wintering grounds, or both. By overlaying this information with GIS-based habitat data, we can identify habitat characteristics that negatively affect breeding success. Management activities can then be directed toward modifying these habitats to create successful breeding sites.

DoD supports about 100 MAPS stations, nearly 20% of the MAPS network. With its network of over 500 stations, MAPS data can help identify temporal and spatial patterns in demographic indices at a variety of scales ranging from the local landscape to the entire continent. Recent advances in modeling and analysis have provided insight into the relationships of these patterns with ecological characteristics and populations trends of target species, station-specific and landscape-level habitat characteristics, and spatially-explicit weather variables.

The Institute for Bird Populations and MAPS:
<http://www.birdpop.org/>



Golden-cheeked Warbler in Mist Net
Photo by Jim Zelevak



Setting Up Mist-net
Photo by Norman Farnsworth



Recording Data at MAPS station
Photo Courtesy of R. Riley



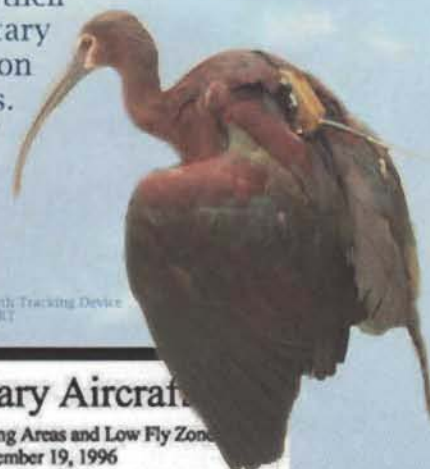
DoD BIRD CONSERVATION PRIORITIES

SATELLITE/REMOTE TRACKING

The development and application of satellite biotelemetry technology to track wildlife has greatly advanced our knowledge of bird movements. Working with DoD PIF, the Center for Conservation Research & Technology (<http://www.ccrt.org>) and others have tracked bird species that breed on, migrate through, or winter on military lands. Initial satellite biotelemetry efforts revealed precise locations of poorly known wintering areas for the Peregrine Falcon that 25 years of traditional leg band returns could not produce. Satellite technology uncovered the exact location of Swainson's Hawk pesticide poisonings in South America and is used to track Snowy Owl movements throughout their annual cycle in the Arctic (which includes several military installations), and White-faced Ibis from their breeding grounds on military lands in western Nevada to their wintering locations. Satellites are also helping to identify sources of DDT contamination and provide invaluable input into bird strike avoidance models.

The DoD Legacy Resources Management Program and the Strategic Environmental Research and Development Program (<http://www.serdp.org>) have funded research into new technologies that may eventually allow remote tracking of migrating passerines over long time scales. Current very high frequency (VHF) tracking devices are limited by the weight of the battery needed to power the transmitter and can only be used on species that weigh at least 50 grams. However, crossband transponder tags that weigh approximately 1 gram are under development. These tags, which can be used on birds as small as 30 grams (such as a tern), use an automated system to trigger, detect, display, and record tag locations, greatly reducing the power requirements.

CCRT: <http://www.ccrt.org>

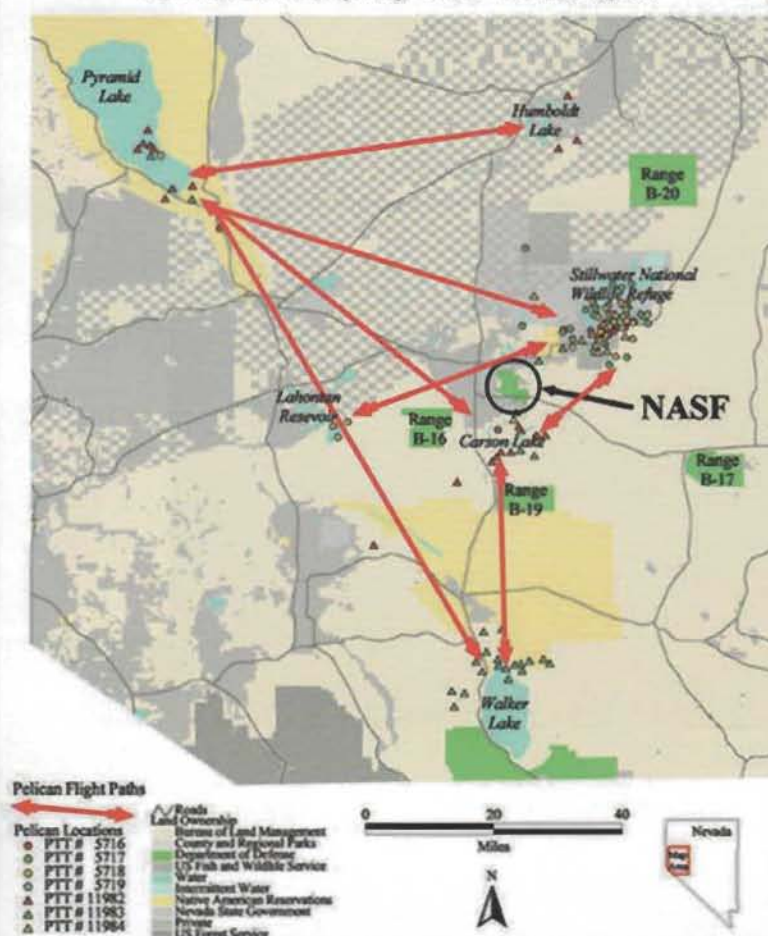


White faced Ibis with Tracking Device
Photo courtesy CCRT

Map courtesy CCRT

Bird Strike Hazards to Military Aircraft

White Pelican Movements in relation to Military Aircraft Training Areas and Low Fly Zones
Naval Air Station Fallon (NASF) -- June 25 - November 19, 1996



White Pelicans and waterfowl species frequent the Naval Air Station Fallon (NASF) Military Operating Area and pose a threat to military aircraft. Bird traffic is heavy surrounding NASF, where pilots train at the Naval Fighter Weapons School (Top Gun), the only such facility in the world. Fallon is also the only Naval facility providing Advanced Integrated Carrier Air Wing Strike Training. Bird strike hazards are an important safety and operational consideration in this region.

DoD BIRD CONSERVATION PRIORITIES

BIRD AIRCRAFT STRIKE HAZARD

Each year, civil and military aircraft strike thousands of birds. The Federal Aviation Administration annually reports at least 2,300 wildlife related strikes involving civil aircraft; the Air Force and Navy report at least an additional 3,000. Yet only an estimated 20 percent of actual bird strikes are reported. Because pilots and crews use the same low altitude airspace as large concentrations of birds, the prevention of bird strikes is of serious concern to the military.

DoD continually implements and improves aviation safety programs in an effort to provide the safest flying conditions possible. One of these programs is the Bird Aircraft Strike Hazard (BASH) prevention program. Throughout the military, natural resources managers implement BASH prevention strategies, while researchers investigate new ways to improve flight safety.

Integral to a successful BASH program is a good working relationship with airport managers and the consistent reporting and identification of species involved in strike events. The Smithsonian Institution helps the military identify birds that were involved in strikes. By knowing the bird species involved and the location of the strike, researchers and airport managers can better understand why the species is attracted to a particular area of the airport or training route. Once the attractant is identified, its source can be removed or modified and if that is not possible, airport operations or training route criteria can be altered.



NAS Patuxent River, MD
Composite by Tamiko den Hartog

Developing an integrated BASH program at a military airfield requires cooperation and communication. Even with deterrent strategies and environmental modifications, certain species of birds continue to use airfields. Through active communication between all parties involved in day-to-day airfield activities, individuals or concentrations of birds can be detected and avoided. Some birds cannot be deterred from using the airfield, but bird strikes can be avoided through constant observation. Rather than trying to remove all birds, which is virtually impossible, the airport environment should be managed to allow for safe operations in the presence of a small number of individuals.



Bird Anti-perch Device on Lighting System, NAS Whidbey Island, WA
Photo by Matt Klope

Due to continued human population growth and urban development around the country, large, grassy areas on airports and adjacent lands are fast becoming islands of preferred bird habitat; however, reducing the risk of bird strikes and managing for bird species do not have to be mutually exclusive. An effective BASH prevention program is vital for safe air operations and in some areas can facilitate priority conservation objectives.

Navy Safety Center/BASH web page: <http://www.safetycenter.navy.mil/aviation/Operations/BASH/bash.htm>
Air Force BASH Team Web page: <http://safety.kirtland.af.mil/AFSC/BASH/>



DoD BIRD CONSERVATION PRIORITIES

LANDSCAPE LEVEL HABITAT CONSERVATION

Habitat conservation must operate at a landscape level in order to be effective. Military lands sometimes are considered their own landscape. DoD lands constitute the largest stretches of undeveloped coastline in southern California. Fort Riley's 100,000 acres encompass an entire grassland ecosystem. Over 90% of the Barry Goldwater Range's 2.7 million acres is undisturbed Sonoran Desert habitat and includes numerous desert habitat types and 23 mountain ranges. Army installations manage some of the largest longleaf pine ecosystems in the Southeast. These habitats support large numbers of listed species (Mountain Plover, California Least Tern, Red-cockaded Woodpecker) and species of high conservation priority (Brown-headed Nuthatch, Bachman's Sparrow, Cerulean Warbler).

Continued loss of streamside habitat puts many riparian-dependent species at risk, especially in the West. Military installations such as Vandenberg Air Force Base and Camp Pendleton maintain some of the best remaining riparian habitat along coastal California. The extensive riparian corridor along the Santa Margarita River running through Camp Pendleton hosts about 70% of the entire breeding population of the endangered Least Bell's Vireo.



Tallgrass Prairie, Ft. Riley, KS
Photo by Mike Han

Partnerships with agencies and other landowners create opportunities to implement management planning at the appropriate spatial scale. For example, the Army Corps of Engineers, in partnership with the City of Phoenix and other local sponsors, is undertaking one of the first large-scale riparian restoration efforts in the western US. The Tres Rios and Rio Salado projects will restore native riparian vegetation to benefit a variety of riparian-dependent bird species and use treated wastewater effluent and captured stormwater runoff as water sources for the stream and adjacent constructed wetlands.



Riparian Habitat, Vandenberg AFB, CA
Photo by Chris Ebert

Flooding along the Missouri River has provided the opportunity to restore historic landscape patterns. Fort Leavenworth contains one of the largest remaining stands of old growth bottomland hardwood forest along the lower Missouri River. Through partnerships, DoD PIF is achieving landscape level conservation by taking a lead role in promoting a reforestation plan along much of the 1.2 million acre lower Missouri River floodplain. Forest products are less susceptible to flood damage, provide farmers a sustainable crop, and restore the natural ecosystem to benefit birds and other fauna, such as the black bear.



DoD BIRD CONSERVATION PRIORITIES

GRASSLANDS

Native grasslands evolved as disturbance-dependent systems. They are one of the most endangered ecosystems in the country. Over 90% of their original range has been lost. Human induced changes to the historic grassland landscape have included direct destruction of native grasslands and disruption or elimination of the natural disturbances that maintained their successional state. DoD lands, especially Army installations, possess some of the best remaining native grassland ecosystems. Military training may involve tank and artillery fire, lasing, or prescribed burning that mimic the historic fire regime. Not surprisingly, some of the largest and most healthy populations of high priority grassland bird species occur on these lands. The former Jefferson Proving Ground supports one of the largest breeding populations of Henslow's Sparrow. The US Fish & Wildlife Service (USFWS) now manages these lands, known as Big Oaks National Wildlife Refuge, using prescribed burns to maintain the 5,000-acre grassland used by this species. A large portion of Fort Riley's 100,000 acres is native tallgrass prairie. Fort Riley also contains one of the largest populations of Henslow's Sparrow. Legacy supported projects are examining avian grassland community composition and the regional differences in grasses and management impacts on grassland birds.

On military lands where agriculture leases support hay crops, special attention should be given to the seasonal timing of haying. Nest success rates often are less than 10% in hay fields because the hay is cut before the nesting cycle is complete. Incubating adults frequently "hold their ground" when haying equipment approaches, resulting in destruction of the adult bird and the eggs/hatchlings. Delaying the haying process until at least July 15 (or August 1 in some regions) will allow most grassland birds nesting in hay fields to successfully fledge their young.

Installations with an active flying mission also can play a significant role in grassland bird conservation. In *Restoring North America's Birds*, Robert Askins writes, "Expending scarce resources to maintain bird habitat in hay meadows, fallow fields, and airfields may seem unwise to conservationists who are accustomed to protecting forest and wilderness areas. However, artificial habitats are critical for many species of birds, insects, plants, and other organisms because people have destroyed most of the native grassland habitat." Grassland restoration efforts may ultimately reintroduce the required natural disturbances. In the meantime, artificial grasslands may represent the best hope for maintaining grassland species in certain areas. When managed for grassland bird species, grasslands surrounding airfields can reduce the BASH risk while providing habitat for priority species that have suffered significant habitat loss in the past 20 years, particularly in the Northeast.



BIRD CONSERVATION FOCUS AREAS

MANGROVE AND TROPICAL HABITATS

Habitat destruction and disturbance are the primary threats to West Indian birds. Over the past several centuries, approximately 9 out of 10 avian extinctions have been of endemic island species. Many neotropical migrants share these same habitats and are also adversely affected by their destruction and disturbance, as the quality of overwintering habitat can inhibit the productivity of these migrants on their temperate breeding grounds. Tropical arid scrub, mud flat, and mangrove and tropical dry forest habitats provide critical stopover and wintering habitat for neotropical migrants and support numerous island endemics. Scientists are studying these habitats, the impacts of weather and climate on migration patterns, and others factors affecting productivity and survivorship of bird species on Navy installations in Puerto Rico and Cuba. In particular, DoD has the greatest potential to preserve and improve habitat conditions in the West Indies.



Los Machos Mangroves, Naval Station Roosevelt Roads, Puerto Rico
Photo by Dan Wilkinson

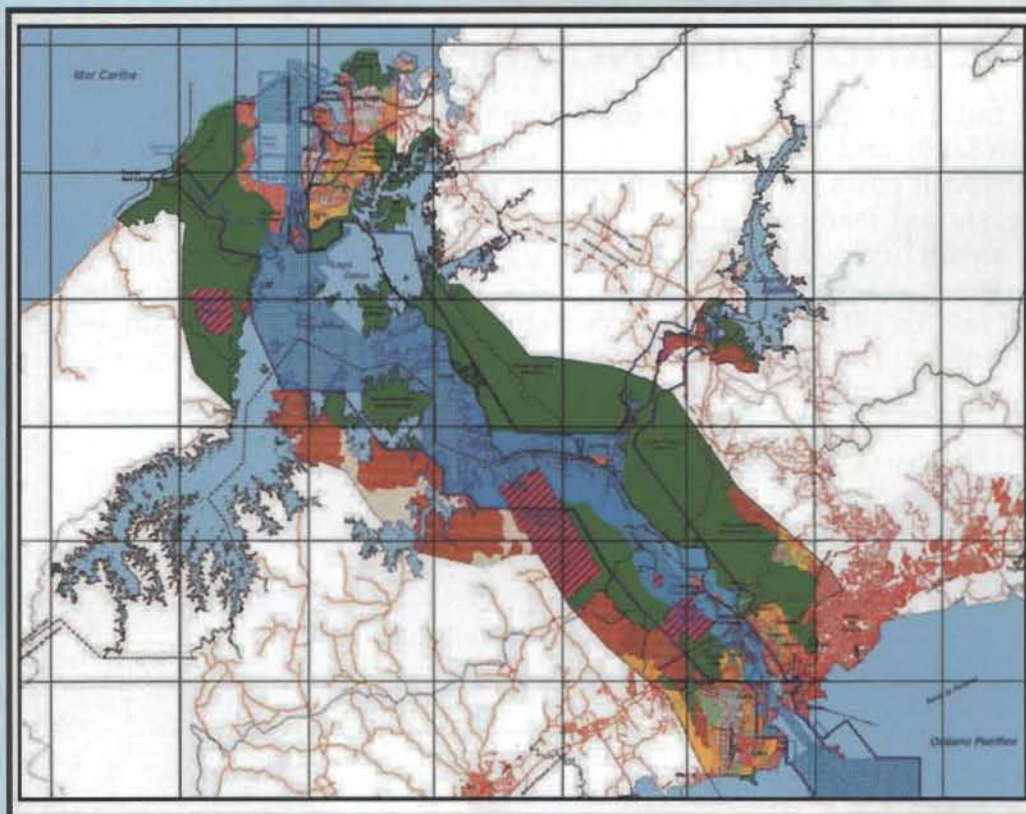


Northern Waterthrush
Photo by Michael L. Gray

DOD BIRD CONSERVATION PRIORITIES

MANGROVES AND TROPICAL HABITATS

For most of the 20th Century, DoD was an influential presence in the Republic of Panama. All DoD-controlled lands around the Panama Canal were transferred to Panama by the end of 1999 under the mandates of the Panama Canal Treaties. Only a small percentage of the 80,000 acres of land that was under DoD care is developed, of which 63,000 acres are tropical forests. These forests include some of the best examples of semi-deciduous forested habitat remaining along the Pacific Coast of Central America. This region acts as a funnel for millions of neotropical migratory birds during their biannual migrations and is crucial to the overwinter survival for migrants such as Acadian Flycatcher and Bay-breasted and Prothonotary Warblers. For several years, DoD PIF worked with myriad conservation groups and the Panamanian government to ensure that this critical habitat would be protected after it was returned to Panama. These efforts included conducting a Rapid Ecological Assessment of DoD lands. The Panamanians were under significant pressure from developers to undertake major construction projects on much of the land, but thanks to the efforts of DoD PIF and many others, these critical habitats have been set aside as protected areas or incorporated into the existing Parque Nacional Soberanía. In addition, the upper Panama Bay remains one of the most significant shorebird stopover and wintering sites in the Western Hemisphere.



Panama Land Use Map
Courtesy Autoridad de la Región Interocánica

The General Land Use Plan of the Canal Areas shows lands formerly under DoD control. The forested areas shown in green are now designated as protected areas under the Plan.



DoD BIRD CONSERVATION PRIORITIES

NATIONAL, REGIONAL AND STATE PIF SUPPORT

DoD representatives are active at all levels of the PIF network. Supporting PIF at the national level is essential to maintaining the "big picture" of bird conservation. Within DoD, conservation directives and guidance are promulgated at the service level. The PIF Flight Plan is integral to and works with DoD's INRMP process.

Regional interaction and support is beneficial to DoD from the perspective of linking landscape level conservation issues among installations and other partners. The landscape often is defined within the physiographic area of a BCP. Priority birds and habitats, shared in the landscape, enable DoD and its public and private partners to better communicate common goals and strategies. DoD PIF representatives are especially active in PIF regional working groups, where they contribute significantly to the bird conservation planning process.

State working groups provide the best opportunities for on-the-ground conservation involvement. DoD often contributes through participation in setting species and habitat priorities and organizing partners for bird conservation projects. Conservation actions primarily occur at the state or local level; hence, creating and maintaining partnerships with state agencies and local conservation groups is key to the success of PIF.

INVASIVE AND NUISANCE SPECIES

Invasive and nuisance species reduce the economic productivity and the ecological integrity of our nation's lands and waters. The rate of introduction of such species has risen markedly in recent years with costs to our society growing commensurately. Invasive species currently represent the second leading cause of habitat loss, which is the primary cause for species decline and extinction. According to the US Department of Agriculture's Agricultural Research Service, managing invasive species is likely to be the largest item in federal natural resources budgets by 2010 and exotic weed control will represent the single largest portion of that requirement. The scope and breadth of the impact felt by invasive species is vast.

Well-known examples include the invasion of the southeastern US by kudzu vines and the destruction of hardwood trees by Asian long-horned beetles. Not all nuisance species are invasive. For example, feral and free-roaming cats can pose hazards to both humans and wildlife (see the *Don't Let Your Cat Go AWOL* brochure). Only by working through coordinated partnerships can we hope to stem the tide of invasive and nuisance species.



Cat at Bird Bath
Photo Courtesy Linda Winter



Purple Loosestrife at Ft. Drum, NY
Photo Courtesy Ft. Drum



Soldier Standing in Yellow Starthistle at Ft. Hunter Liggett, CA
Photo Courtesy Ft. Hunter Liggett

DoD BIRD CONSERVATION PRIORITIES

COMMUNICATION TOWERS AND POWER LINES

Manmade structures are a common cause of bird injuries and fatalities. The profusion of new towers to support cellular phone and digital television transmitters has increased awareness of their dangers to migrating birds. The problem is especially pronounced during nocturnal passerine migrations in foggy or inclement weather. The USFWS has issued guidance, established a web site, and formed a Communication Tower Working Group to bring government and private interests together and to disseminate information to the public (see <http://www.towerkill.com> for more information).

Power lines present another source of potential mortality, especially for raptors in western states. Several raptor conservation organizations and industry groups have established strategies to minimize the risk of dangerous power lines electrocuting these birds by adding safety features to new power lines and retrofitting old ones. DoD PIF is working to reduce avian mortality by encouraging installations to use appropriate tower lighting systems, properly siting new towers, removing decommissioned towers in a timely manner, and by following safe power line guidelines.



Ferruginous Hawk
Photo by Mike Stubbiefield



Cell Communication Tower
Photo courtesy US Navy

CITIZEN SCIENCE

Citizen Science, sometimes referred to as "birding with a purpose," provides volunteer and amateur ornithologists an opportunity to collect bird monitoring data. DoD personnel participate in citizen science projects such as Project Tanager, Bird in Forested Landscapes, the annual Christmas Bird Count, Migration Monitoring, and Project Prairie Birds. These and other local volunteer-assisted projects provide invaluable data collection resources to DoD natural resources personnel.



PESTICIDES

Each year, an estimated 67 million birds die from pesticide exposure on farms alone. One billion pounds of pesticides are applied annually and annual pesticide use continues to increase in terms of pounds applied and number of registered "active" ingredients. According to the USFWS, approximately 50 pesticides currently used in the United States have caused bird die-offs. Responsible and appropriate use of all pesticides is extremely important. Pesticides (primarily insecticides and herbicides) are an important tool in food production, habitat restoration, disease control, and pest control. Because this tool poses risks to wildlife, DoD PIF encourages installation personnel involved in pesticide use to understand the impacts, limitations, and proper application of all pesticides before they are applied (see <http://www.abcbirds.org/pesticides/pesticideindex.htm> for more information).



HIGHLIGHTS & ACCOMPLISHMENTS

- ✓ Worked to reduce bird aircraft strike hazards by encouraging the use of mobile radars, satellite tracking, and other technologies
- ✓ Incorporated PIF Bird Conservation Plan management strategies into installation Integrated Natural Resources Management Plans
- ✓ Conducted studies to determine the effects of various land management activities and military impacts on birds and their habitats
- ✓ Integrated management of all birds and all habitats into planning activities
- ✓ Restored and enhanced habitat for the benefit of migratory and resident birds
- ✓ Distributed PIF publications, especially *Bird Conservation* magazine, to DoD natural resources managers
- ✓ Provided access to DoD lands to researchers (federal and state agencies, NGOs, academia) as study areas
- ✓ Developed outreach materials (display, brochure, etc.), gave presentations, and provided representation at various state, regional, national, and international conferences
- ✓ Created DoD bird projects database and supported PIF species assessment database
- ✓ Published articles in non-DoD magazines and newsletters highlighting DoD bird conservation activities
- ✓ Established a network of biologists and natural resources managers to facilitate communication of DoD PIF goals and objectives



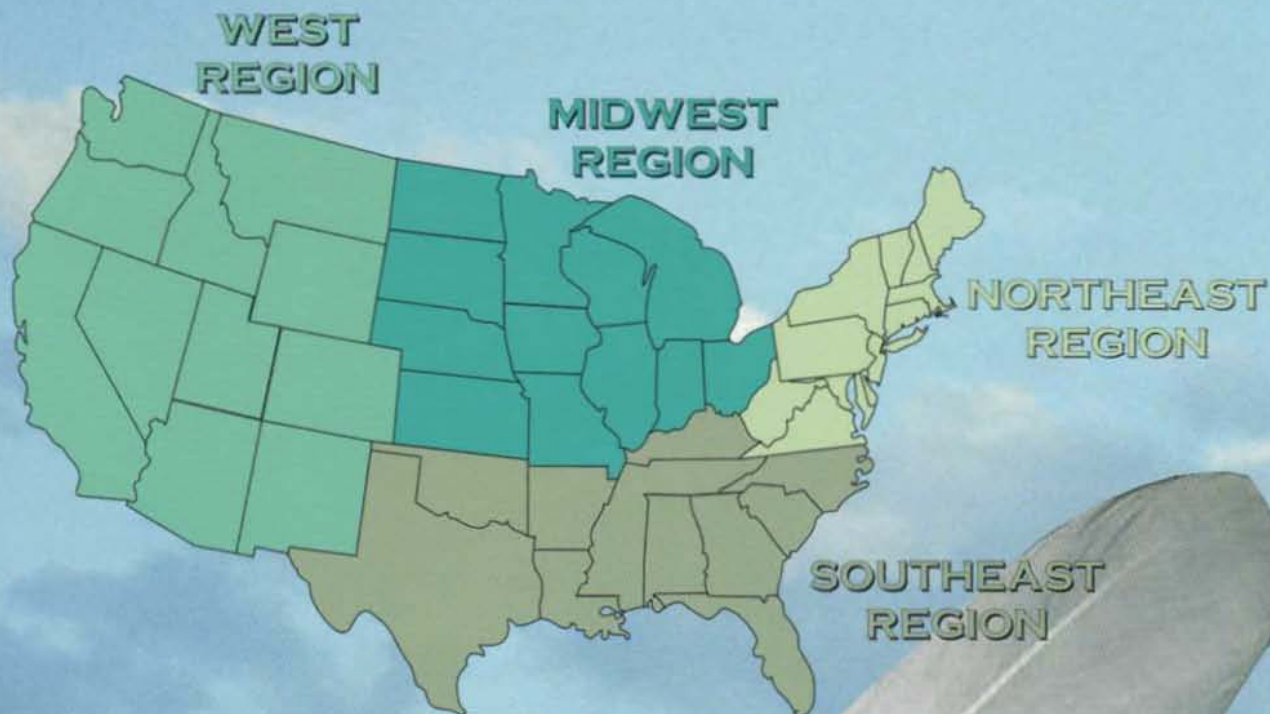
Barn Swallow
Photo by Michael L. Gray

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Journal of the National Wildlife Refuge, 1999
Photo by Michael Heston/USFWS



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ACKNOWLEDGMENTS

SPECIAL THANKS TO RUSS GREENBERG AND MARY DEINLEIN OF THE SMITHSONIAN MIGRATORY BIRD CENTER FOR HELP WITH AND USE OF THE SPECIES RANGE MAPS. THANKS TO RICHARD BACHAND AND BRAD NUNLEY OF THE NATIONAL WILDLIFE FEDERATION FOR THE GRASSLAND MAP. WE WOULD ALSO LIKE TO THANK TAMIKO DEN HARTOG FOR HER TREMENDOUS WORK ON THE LAYOUT OF THIS DOCUMENT AND THE DoD PIF LOGO DESIGN.

AND THANKS TO ADI TECHNOLOGY CORPORATION, PETER BOICE, ALISON DALSIMER, TOM EGELAND, AND ALAN SCHULTZ FOR THEIR REVIEWS.

THE KIND COOPERATION OF NATURAL RESOURCES MANAGERS FROM INSTALLATIONS NATIONWIDE IS GRATEFULLY ACKNOWLEDGED.



FUNDING PROVIDED BY
THE DoD LEGACY RESOURCES
MANAGEMENT PROGRAM

PUBLICATION DATE: 2002



PRINTED ON 20% POST-CONSUMER CONTENT PAPER
ACID-FREE, CHLORINE-FREE (TCF, PCF)